MGT388
Finance for Engineers

Lecture 2

Horizontal, Trend and Ratio Analysis: profitability, efficiency, and liquidity

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Learning Outcomes

At the end of this lecture, students should:

- Understand the principal features and usefulness of the analysis of trends in financial statements.
- Be able to perform an analysis based on horizontal, vertical, and ratio analysis of financial statements.
- Understand the problems which can arise in comparing businesses with each other.

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Marveg Case

- Start-up January 2016
- Production and sale of vegetable smoothie drinks in the UK
- Innovative technology that pasteurises fresh drinks (8-week shelf life)
- Two directors initially invested £50,000 of share capital
- Long-term secured borrowings, over 4 years starting January 2017
- Short-term bank overdraft facility £ 40,000 (to cover payments to suppliers, due to be reviewed 1 April 2018)



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Marveg Case

- In 2016: Good performance, selling to 3 large supermarkets and securing a contract with another supermarket to produce an own-brand product (October 2016)
- Potential expansion in both domestic and overseas markets, but with significant investment in PP&E
- Administrative expenses (2016): professional fees £30,000, marketing £40,000, cost of training staff in the production process £20,000

Would you invest in Marveg?

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Marveg Case

Income Statement	2017 Forecast £'000	2016 Actual £'000
Revenue	1,020	800
Cost of sales	(620)	(520)
Gross profit	400	280
Operating expenses	(190)	(210)
Operating profit	210	70
Finance costs	(25)	(20)
Profit before tax	185	50
Taxation	(30)	(20)
Profit for the year	155	30

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Marveg Case

Statement of Financial Position as at 31 December 2016

	£'000		£'000
Non-current assets		**Equity and Liabilities**	
Property, plant and equipment	350	Ordinary shares	100
Intangible assets	52	Retained earnings	30
	402		130
Current assets		**Non-current liabilities**	
Inventories	40	Long term debt	350
Receivables	140		
	180	**Current Liabilities**	
		Trade payable	50
		Corporation tax	12
		Overdraft	40
			102
Total assets	582	**Total equity &liabilities**	582

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Horizontal Analysis

- **Horizontal analysis**

Compare two or more figures to assess the differences between them.

Between 2016 and 2017 sales (revenue) were expected to rise by £ 220 (£ 1,020 – 800), an increase of 27.5 per cent.

Is this good news? It depends on the context.

Some problems with Horizontal Analysis

- Changes in the business
  - Figures are not really comparable.
  - New accounting standards and rules may have come into force.

- Failure to take the effects of inflation into account
  - Accounts are not usually adjusted for inflation in the UK.
  - Even where the inflation rate is low, the effects can be substantial over several years.

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Vertical Analysis and Common Size Analysis

- **Vertical analysis**

Expresses each figure in a financial statement as a percentage of one key figure (e.g. sales in the income statement).

- **Common size analysis**

Extends vertical analysis over more than one accounting period.

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Vertical Analysis and Common Size Analysis

	2017 forecast		2016 actual	
Income Statement	**£'000**	**%**	**£'000**	**%**
Revenue	1,020	100%	800	100%
Cost of sales	620	61%	520	65%
Gross profit	**400**	**39%**	**280**	**35%**
Operating expenses	190	19%	210	26%
Operating profit	**210**	**21%**	**70**	**9%**
Finance costs	25	2%	20	3%
Profit before tax	**185**	**18%**	**50**	**6%**
Taxation	30	3%	20	3%
Profit for the year	**155**	**15%**	**30**	**4%**

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Vertical Analysis and Common Size Analysis: Comments

- Gross profit percentage was expected to rise from 2016 to 2017.
- All expenses were expected to fall.
- Tax percentage was expected to remain constant.

Is this good news? The comparison with other businesses is needed to fully understand.

Comparing Businesses with Each Other

Importance of comparability

BUT note:

- Differences in accounting policies
- Differences in business activities
- Misleading industry averages

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Profitability Analysis

Return on Capital Employed (ROCE)

$$\text{ROCE} = \frac{\text{Operating profit}}{\text{Equity funds} + \text{Non Current liabilities}}$$

Money from shareholders

Money from banks

Can the business turn the money into profits?

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Profitability Analysis

2016 ROCE

$$\text{ROCE} = \frac{\text{Operating profit}}{\text{Equity + Non Current Liabilities}}$$

$$\text{ROCE} = \frac{70}{130 + 350}$$

$$\text{ROCE} = 14.6\%$$

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Profitability Analysis

The ROCE figure achieved by a business may be as a result of:

- Profitability: Gross profit and operating profit margins

AND/OR

- Efficient utilisation of assets: Net asset turnover

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Profitability Analysis

Gross profit margin

$$\frac{\text{Gross profit}}{\text{Revenue}} \quad \frac{280}{800} = \quad 35\%$$

Indicates how profitable the core business is.
The only expense category in gross profit is cost of sales.
Every £1 of revenue converts to 35p gross profit.

Forecast gross profit margin $\frac{400}{1{,}020} = 39.2\%$

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Profitability Analysis

Operating profit margin $\frac{\text{Operating profit}}{\text{Revenue}} = \frac{70}{800} = 8.8\%$

Operating profit includes cost of sales, administration and distribution costs.
Every £1 of revenue is being converted into 8.8p operating profit.

Forecast operating profit margin $= \frac{210}{1{,}020} = 20.6\%$

If there is a change in operating profit margin, highlight which expense has increased/decreased and explain.
Look at cost control by management.

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Profitability Analysis

Net asset turnover

$$\frac{\text{Revenue}}{\text{Equity + non-current liabilities}} = \frac{800}{130 + 350}$$

Net asset turnover = 1.67 times

For every £1 worth of investment available £1.67 of turnover is generated.

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Profitability Analysis

ROCE

Is the key ratio to how a company is performing this can be explained in isolation but is a product of a company's profitability and efficiency

ROCE = Operating Profit Margin X Net Asset Turnover

$$\frac{\text{Operating profit}}{\text{Equity + Non-current liabilities}} = \frac{\text{Operating profit}}{\text{Revenue}} \times \frac{\text{Revenue}}{\text{Equity + Non-current liabilities}}$$

14.6%= 8.8% X 1.67

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Efficiency Analysis

Inventory holding period = $\frac{\text{Closing inventory}}{\text{Cost of sales}}$ X 365 days

Inventory holding period 31/12/16

$\frac{40}{520}$ X 365 days = 28 days

Forecast inventory holding period 31/12/2017
(Closing inventory: 30)

$\frac{30}{620}$ x 365 days = 18 days

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Efficiency Analysis

Collection period = $\frac{\text{Trade receivable}}{\text{Revenue}}$ X 365 days

Collection period 31/12/2016

$$\frac{140}{800} \times 365 \text{ days} = 64 \text{ days}$$

Forecast collection period 31/12/2017
(Trade receivable: 290)

$$\frac{290}{1{,}020} \times 365 \text{ days} = 104 \text{ days}$$

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Efficiency Analysis

$$\text{Payment period} = \frac{\text{Trade payables}}{\text{Cost of sales}} \times 365 \text{ days}$$

Payment period 31/12/16

$$\frac{50}{520} \times 365 \text{ days} = 35 \text{ days}$$

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Liquidity Analysis

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \qquad \frac{180}{102} = 1.76$$

For every £1 of current liability the company has £1.76 of current assets.

This would indicate debts could be met when they fall due.

The industry is very important. For example, supermarkets tend to have low current ratios because:

- there are few trade receivables
- there is a high level of trade payables
- there is usually very tight cash control, to fund investment in developing new sites and improving sites.

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Liquidity Analysis

Acid test ratio

$$\frac{\text{Current assets- inventory}}{\text{Current Liabilities}} \qquad \frac{180-40}{102} = 1.37$$

Why remove inventory?

The time lag of turning inventory into cash

Inventory Trade receivable Cash

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Liquidity Analysis

- The business does not appear to have liquidity problems. However, a low value of inventory should be expected as the items are perishable.
- A too high value of inventory may indicate obsolete items.
- It may be that the supermarkets can demand extended credit which would suggest a high receivables value.
- The current liabilities are largely an overdraft and trade payables.
- It could be that any expansion would lead to liquidity problems.

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Solvency Analysis

Gearing (or Debt to Equity ratio)

$$\frac{\text{NON-CURRENT LIABILITIES + OVERDRAFT + PREFERENCE SHARES}}{\text{ORDINARY SHARE CAPITAL + RETAINED EARNINGS}}$$

Note: Debt includes non-current liabilities and normally preference shares. If the business has a current loan or overdraft that is semi-permanent, it should also be regarded as debt.

Debt to Equity ratio

$$\frac{\text{Debt}}{\text{Equity}} = \frac{390}{130} = 3X$$

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Solvency Analysis

A business that is highly geared (a high level of debt) with have high levels of interest payable (finance charges).

The interest payable must be met from the operating profit. In order to assess the financial risk of a business not being able to meet the interest payments an interest cover ratio is calculated.

$$\text{Interest cover} = \frac{\text{Operating profit}}{\text{Interest payable}}$$

$$\text{2016 interest cover} \quad \frac{70}{20} = 3.5X$$

$$\text{Forecast interest cover} \quad \frac{210}{25} = 8.4X$$

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Would you invest in Marveg?

The business appears **profitable and well run**. However, some **concerns** would be:

- Relying on the competitive advantage of the new technology. Is the intellectual property protected? Is any further advancement likely? Who are their competitors?
- Reliance on a few large supermarkets. Are there any other potential customers? The length of contracts? The credit terms offered to supermarkets are a concern.
- Confirmation that no further debt will be taken on and future dividend payments will be made.

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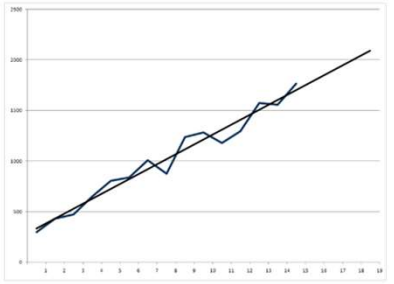
How are ratios used?

Operating profit margin
Customer satisfaction
Carbon emissions



Can depict easily in charts/graphs

Can help compare results over time

Allows comparison of organisations of different size, location and type.

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Your Reading (optional)

Gowthorpe:

Chapter 8: Understanding Financial Reports: Trend Analysis, pp. 164 – 174.

Chapter 9, Understanding Financial Reports: Using Accounting Ratios, pp. 181 – 190 and pp. 193-194.